

Task Order No. 832  
USAID Contract No. PCE-I-00-96-00002-00

**Egyptian Environmental Policy Program  
Program Support Unit**

**WORK ASSIGNMENT REPORT  
Tranche 2, Policy Measure 6.2**

*Preliminary Assessment of Vulnerability*  
*Mohamed Rashed*  
*January 2002*

PSU-65

for  
**U.S. Agency for International Development  
Cairo**

by  
**Environmental Policy & Institutional Strengthening  
Indefinite Quantity Contract (EPIQ)**

**A USAID-funded project consortium led by International Resources Group, Ltd.**

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## About the Author

Mohamed Ibrahim Rashed has a rich background in finance, administration, and project management. After receiving his Bachelor of Commerce degree from Ain Shams University (Faculty of Commerce), he worked for 20 years with private sector construction/project implementation firms before joining the Egyptian Environmental Affairs Agency in 1996 as the Program Manager of the Environmental Disaster and Contingency Planning Unit within the Technical Cooperation Office for the Environment. There, he was instrumental in preparing a draft National Environmental Disaster Contingency Plan, establishing a contingency database, and planning the Environmental Disaster Contingency Plan Central Operations Room. He joined the Program Support Unit–Egyptian Environmental Policy Program in 2001, to guide the Tranche 2 policy measure work on finalizing the National Environmental Disaster Contingency Management Plan.

## Fact Sheet

<b>USAID Contract No.:</b>	PCE-I-00-96-00002-00 Task Order No. 832
<b>Contract Purpose:</b>	Provide core management and analytical technical services to the Egyptian Environmental Policy Program (EEPP) through a Program Support Unit (PSU)
<b>USAID/Egypt's Cognizant Technical Officer:</b>	Holly Ferrette
<b>Contractor Name:</b>	International Resources Group, Ltd.
<b>Primary Beneficiary:</b>	Egyptian Environmental Affairs Agency (EEAA)
<b>EEAA Counterpart:</b>	Mohamed A. Borhan Director General, Coastal Zone Management General Directorate, and National Oil Spill Contingency Plan Coordinator
<b>EEPP Policy Objective:</b>	Increased GoE capacity to conduct long-term strategic planning, policy formulation, analysis, and coordination
<b>EEPP Policy Measure:</b>	EEAA develops and adopts a strategic National Environmental Disaster Contingency Management Plan
<b>Work Assignment Title:</b>	Provide assistance regarding national environmental disaster contingency management planning
<b>Work Assignment Author:</b>	Mohamed Rashed
<b>Work Assignment Supervisor:</b>	Will Owen
<b>Work Assignment Period:</b>	September – December 2001

## Preface

Through competitive bidding, the U.S. Agency for International Development (USAID) awarded a multi-year contract to a team managed by International Resources Group, Ltd. (IRG) to support the development and implementation of environmentally sound strategic planning, and strengthening of environmental policies and institutions, in countries where USAID is active. Under this contract, termed the Environmental Policy and Institutional Strengthening Indefinite Quantity Contract (EPIQ), IRG is assisting USAID/Egypt with implementing a large part of the Egyptian Environmental Policy Program (EEPP).

This program was agreed-to following negotiations between the Government of the United States, acting through USAID, and the Arab Republic of Egypt, acting through the Egyptian Environmental Affairs Agency (EEAA) of the Ministry of State for Environmental Affairs, the Ministry of Petroleum's Organization for Energy Planning, and the Ministry of Tourism's Tourism Development Authority. These negotiations culminated with the signing of a Memorandum of Understanding in 1999, whereby the Government of Egypt would seek to implement a set of environmental policy measures, using technical support and other assistance provided by USAID. The Egyptian Environmental Policy Program is a multi-year activity to support policy, institutional, and regulatory reforms in the environmental sector, focusing on economic and institutional constraints, cleaner and more efficient energy use, reduced air pollution, improved solid waste management, and natural resources managed for environmental sustainability.

USAID has engaged the EPIQ contractor to provide Program Support Unit (PSU) services to EEPP. The PSU has key responsibilities of providing overall coordination of EEPP technical assistance, limited crosscutting expertise and technical assistance to the three Egyptian agencies, and most of the technical assistance that EEAA may seek when achieving its policy measures.

The EPIQ team includes the following organizations:

- Prime Contractor: International Resources Group
- Partner Organization:
  - Winrock International
- Core Group:
  - Management Systems International, Inc.
  - PADCO
  - Development Alternatives, Inc.
- Collaborating Organizations:
  - The Tellus Institute
  - KBN Engineering & Applied Sciences, Inc.
  - Keller-Bliesner Engineering
  - Conservation International
  - Resource Management International, Inc.
  - World Resources Institute's Center For International Development Management
  - The Urban Institute
  - The CNA Corporation.

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## Abbreviations, Acronyms, and Glossary

ATF	Agency Task Force
CEO	Chief Executive Officer (of EEAA)
COP	Chief of Party
CTO	Cognizant Technical Officer. This is the USAID person responsible for supervising a technical assistance contractor.
EDMU	Environmental Disaster Management Unit (of EEAA)
EEAA	Egyptian Environmental Affairs Agency
EEPP	Egyptian Environmental Policy Program (a USAID-funded program aimed at achieving a series of environmental policy reform performance objectives)
EEPP-PSU	Egyptian Environmental Policy Program, Program Support Unit
EPIQ	Environmental Policy and Institutional Strengthening Indefinite Quantity Contract. This is a contract issued by USAID's Global Bureau that enables environmental policy services to be provided to USAID missions worldwide.
GoE	Government of Egypt
H	High
IC	Industrial cities
IRG	International Resources Group, Ltd. (a Washington DC-based consulting firm that is prime contractor for USAID's EPIQ contract)
km <sup>2</sup>	Square kilometers
L	Low
M	Medium
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
MoV	Means of Verification
MSEA	(Egyptian) Ministry of State for Environmental Affairs
MVE	Monitoring, Verification, & Evaluation (MVE is a the USAID-funded unit established to monitor, verify and evaluate progress of EEPP. It is being implemented by the US-based company Chemonics International)
NEDCMP	National Environmental Disaster Contingency Management Plan
OEP	(Egyptian) Organization for Energy Planning (attached to the Ministry of Petroleum)
PSU	Program Support Unit (the name of the USAID-funded contract that is to provide overall coordination for the EEPP, as well as provide technical assistance to EEAA under the EEPP)
SK	Shoubra El-Kheima
TDA	(Egyptian) Tourism Development Authority (attached to the Ministry of Tourism)
ToR	terms of reference
USAID	U.S. Agency for International Development

# 1. Introduction

The terms *vulnerable* and *vulnerability* are common terms in the lexicon of development, but their use is often vague, often seen as substitutes for *poor* and *poverty*. To be useful, vulnerability has to be defined in terms of what it is that a population is considered to be vulnerable to and its definition, therefore, must be specific. In the case of environmental disasters, vulnerability would need to be defined in terms of vulnerability to hazards and the various factors contributing to it.

## 1.1 Definition of Vulnerability

An aggregate measure for a given population or region of the risk of exposure to disaster events and the ability of the population to cope with the consequences of that disaster

This definition sees vulnerability as being composed of two principal components:

1. Risk of exposure to different types of disaster events. Severity may vary both between areas and population groups and between different events.
2. Ability of the population to cope with different types of disaster events. The ability of a given population to cope – to physically survive with its livelihood more or less intact – will depend on the type of event, the options open to the population, and their ability to utilize those options.

Vulnerability of each segment of the population and each area is discussed separately.

## 1.2 Population Vulnerability

In the context of environmental disasters, the vulnerability of a population to environmental hazards depends on the status of the environmental, as well as other socioeconomic factors. The criteria for preliminary assessment of vulnerability of relevant populations includes the following parameters:

### 1. Physical Environment

- Nearness to potential source of the hazard
- Deterioration of local infrastructure/buildings
- Lack of preparedness and mitigation capabilities
- Degradation of environmental status.

### 2. Socioeconomic Environment

- High population density
- Lack of training and education
- Weakness of local economy
- Lack of awareness.

For the purpose of preliminary assessment, each of the two parameters above is evaluated and graded according to its effect on vulnerability. In each case, three levels of vulnerability will

be considered: High (H), Medium (M), and Low (L); where high (H) indicates the highest effect on vulnerability. In other words, the higher the number of times grade (H) is given, the higher the vulnerability of the population to the considered environmental hazard. Definitions for the three levels of vulnerability follow for each parameter mentioned above.

1. Nearness to potential hazard sources

This parameter was not considered in this work because in all cases the worst-case scenario was kept in mind during the process of evaluation. In this scenario, the potential hazard source is as it can be.

2. Deterioration of infrastructure/buildings

H	Old and dangerous.
M	Medium level
L	Strong and safe

3. Lack of preparedness and mitigation capabilities

H	Low level of preparedness and availability of mitigation measures.
M	Medium level
L	High level.

4. Degradation of environmental status

H	Low quality of environment (air, water, soil)
M	Medium level
L	High quality of environment (air, water, soil)

5. High population density

H	Very high population density
M	Medium level
L	Low population density

6. Lack of training and education

H	Very low levels of training and education
M	Medium level
L	High levels of training and education

7. Weakness of local economy

H	Very poor and low income level, or an economy that cannot sustain a disaster
M	Medium level
L	High standard of living

8. Lack of awareness

H	Very low level of awareness
---	-----------------------------

M	Medium level
L	High level of awareness

It is worth noting that although Egypt covers 1 million km<sup>2</sup>, only about 6 percent is normally habitable, and the rest is desert. This basic fact should indicate how vulnerable is the population/area to disasters in general.

Table 1 shows the findings of the preliminary assessment of vulnerability. The second column of the table (area) includes the areas of high population density, e.g. cities, villages, and other settlements. The assessment of vulnerability is based on the best professional judgment, considering the above-mentioned criteria.

### 1.3 Area Vulnerability

In the context of environmental disasters, the vulnerability of an area to environmental hazards depends mainly upon the environmental status. The following parameters constitute the main criteria for preliminary assessment of vulnerability of the relevant areas. They are entirely physio-chemical in nature.

- Water resources
- Flora
- Fauna
- Uniqueness of features

For the purpose of preliminary assessment, each of the above parameters is evaluated and graded in terms of its contribution to the area vulnerability. For example, the low density of flora and fauna in Sinai makes it less vulnerable to hazards towards flora than the Delta. The same designations of H, M, and L for high, medium, and low effect on vulnerability are used as before.

Since we are dealing with physical features, Egypt will be looked at as seven distinct geographical regions: Sinai, Canal Zone, Red-Sea Shore, Eastern Desert, Delta and Nile Valley, the Mediterranean coast, and the Western Desert.

The preliminary assessment of area vulnerability is applied for accidental chemical, radioactive, and biological releases, as shown in table 2.

**Table 1 Preliminary Assessment of Population Vulnerability To Accidental Releases**

Area	Aggregate Estimation	Physical Environment			Socio-economic Environment		
		Deterioration of Local Infrastructure	Lack of Preparedness and Mitigation Capabilities	High Population Density	Lack of Training and Education	Weakness of Local Economy	Lack of Awareness
Urban							
Cairo							
Helwan	M	L	M	H	M	M	M
Sawah-America	H	L	H	H	H	H	H
Shoubra	H	H	H	H	H	H	H
Giza	M	M	H	H	M	M	M
Alexandria							
Abo-Kier	M	M	M	M	H	H	H
Alex-South	H	M	H	H	H	H	M
El-Amria	M	L	M	M	M	M	M
Port Said	L	L	M	M	M	M	M
Suez	L	L	M	L	M	M	M
Lower Egypt							
Damietta	L	L	M	M	M	M	M
Dakahlia	H	H	H	H	M	H	M
Talkha							
Sharkia	H	H	H	H	M	H	M
Kaliobia	H	H	H	H	H	H	H
Kafr El-Sheikh	H	H	H	H	M	H	M
El-Gharbia	H	H	H	H	H	H	M
Kafr El-Zayat							
Menofia	H	H	H	H	H	H	M

Area	Aggregate Estimation	Physical Environment			Socio-economic Environment		
		Deterioration of Local Infrastructure	Lack of Preparedness and Mitigation Capabilities	High Population Density	Lack of Training and Education	Weakness of Local Economy	Lack of Awareness
El Behara Kafr El-Dawar	H	H	H	H	H	H	M
Ismailia	M	M	H	M	H	H	M
Upper Egypt							
Giza	H	M	H	H	H	H	M
Beni Suef	H	H	H	M	H	H	M
Fayoum	H	H	H	M	H	H	M
Minya	H	H	H	M	H	H	M
Assiut	M	M	M	M	M	H	M
Souhag	H	H	H	M	H	H	H
Qena	H	H	H	M	H	H	H
Aswan	M	M	M	L	M	H	M
Border Governorates							
Red Sea	H	H	H	L	M	H	M
New Valley	M	H	H	L	H	H	H
Matrouh	M	H	H	L	H	H	H
Northern Sinai	M	H	H	L	H	H	H
Southern Sinai	M	M	H	L	H	H	H
Other							
Industrial Cities	L	L	M	L	M	M	M

Key: H = High Vulnerability, M = Medium Vulnerability, and L = Low Vulnerability

NOTE: Aggregate evaluation is based on numerical estimation assigned to vulnerability levels, assuming the same weight for all parameters.

**Table 2 Preliminary Assessment of Area Vulnerability to Accidental Releases**

Area	Aggregate Estimation	Chemical				Radioactive				Biological			
		FL	FA	WR	U	FL	FA	WR	U	FL	FA	WR	U
Sinai	M	L	L	H	H	L	L	L	M	M	M	M	M
Canal Zone	M	M	M(F)	H	NA	M	M	M	NA	H	H	H	NA
Red-Sea Shore	L	NA	H(F)	NA	H	NA	H	NA	H	NA	H	NA	H
Eastern Desert	L	NA	L	L	L	NA	H(P)	L	H(P)	NA	H	L	H(P)
Mediterranean Coast	M	NA	H(F)	M	H	NA	H(F)	H	NA	NA	H	H	L
Delta and Nile Valley	H	H	H	H	H	H	H	H	NA	H	H	H	NA
Western Desert	M	M	L	L	L	M	H	L	H(P)	M	H	L	H(P)

H: High      M: Medium      L: Low      NA: Not Applicable

FL= Flora      FA = Fauna      WR = Water Resources      U = Uniqueness

F = Fish      P = Protected Area

## 2. Examples to Illustrate Methodology

### 2.1 Population Vulnerability

A comparison between the preliminary assessments of vulnerability of both the industrial cities (IC) and the Kalioubia Governorate may help to illustrate the methodology used. In general, Kalioubia is the nearest Lower Egyptian Governorate to Cairo. It also includes Shoubra El-Kheima (SK), which is a part of Greater Cairo that is home to hundreds of small, medium, and large industrial facilities. It is also densely populated and lacks quality services. The new industrial cities are less densely populated and enjoy much better services.

This is a comparison that utilizes each of the above-mentioned parameters:

#### 1. Deterioration of infrastructure

SK – Roads are mostly unpaved, there is no system for garbage collection, and fresh-water supply does not reach all locations. (H)

IC – In all industrial cities, roads are paved, garbage collecting systems are functioning, and water supply is warranted for all. (L)

#### 2. Lack of preparedness

SK – Due to the general lack of funding of save and rescue systems in Egypt, and due to the unplanned layout of this particular area, it has a low degree of general preparedness and mitigation capabilities. (H)

IC – Because of the planned layout of the industrial cities, their degree of preparedness and mitigation capabilities is at a higher level. (M)

#### 3. Degradation of the environmental status

SK – The environmental status is well degraded. Garbage and solid waste are not collected. Many plants are contaminating the air with hazardous emissions. The quality of water at the nearby Ismailia Canal is not high. (H)

IC – Because these cities are new, the quality of air is still high, and sewerage systems are still functioning efficiently. However, solid wastes are beginning to become a problem. (M)

#### 4. High population density

SK – This is an old industrial district with a very high population density. (H)

IC – The Egyptian industrial cities have low population densities. For example, 10<sup>th</sup> of Ramadan City has a population of 75,000 over a large area. (L)

#### 5. Lack of training and education

SK – The population mass of SK has a low level of education and training. (H)

IC – The population mass of the industrial cities has a relatively higher level of education and training. (M)

#### 6. Weakness of local economy

SK – Local economy cannot contain nor sustain a disaster. (H)

IC – Local economy can absorb a disaster to certain extent. (M)

#### 7. Lack of awareness

SK – The population in general is not aware of the need for preparedness for disasters. (H)

IC – The population has an idea regarding the need for disaster preparedness measures through the process of getting licenses from the Civil Defense Authority, etc. (M)

## 2.2 Area Vulnerability

As mentioned above, Egypt is divided into seven distinct geographical regions: Sinai, Canal Zone, Red-Sea Shore, Eastern Desert, Delta and Nile Valley, the Mediterranean coast, and the Western Desert. Each region has its own characteristics that dictate its vulnerability to accidental releases of hazardous materials.

The main features of each of these regions are described, and then its vulnerability to specific releases is assessed. Accidental chemical, radioactive, and biological releases are the main hazards.

The following is a brief account on the main characteristics of each of the geographical regions of Egypt:

- **The Sinai Region:** Sinai Peninsula represents about 6 percent of the total area of Egypt. It is characterized by the fact that while the southern part is mountainous and rugged, the northern two-thirds of the Peninsula is formed of slopes and has good potential for agricultural activities in some of its areas. The population densities of flora and fauna are light in the north, and even scarcer in the south. The north is rainy, and flash floods occur frequently. The Bedouin population is dependent on storing water underground for their personal use and light agricultural activities. The Sinai Region is exposed to earthquakes and flash floods.
- **The Canal Zone:** The Canal Zone encompasses the Suez Canal, the Bitter Lakes, Lake Tamsah, and the three cities of Port Said, Ismailia, and Suez. It encompasses a series of villages and fruit orchards. The Canal Zone, especially the Southern part of it, is exposed to earthquakes.
- **The Red Sea Shore:** This area is almost 1,000 kilometers long, including the coastal area of Sinai with many coral reef zones near the coast. It has rich marine life and fascinating sandy beaches. The coastal areas of Sinai have the same features, with legally protected sensitive environmental areas. Fresh water resources are scarce and the same goes for

flora and fauna. The Red Sea shore is exposed to flash floods from the eastern plateau and the mountains in the eastern desert.

- **Eastern Desert:** This region represents about 22 percent of the total area of Egypt. It is a series of plateaus dissected by drainage and wadis, and a series of mountains along the Red Sea.
- **Mediterranean Coast:** One thousand kilometers of coastline that encompasses several lakes and receives the water of the Nile at two end points, Damietta and Rosetta. It extends from Raffah at the eastern border with Palestine to El-Salloum at the western border with Libya. Several cities are located on it. The area between Port Said to Sedi Abdel-Rahman suffers from several forms of severe environmental deterioration.
- **The Nile Valley and the Delta:** Most of the country's population live in the Nile Valley and Delta, the narrow valley in Upper Egypt and the flat Delta encompass most of the flora of Egypt that is limited by intensive cultivation and irrigation. The southern part of the Nile Valley is exposed to flash floods, while the middle part is exposed to earthquakes, which are not as frequent as those in the Sinai.
- **The Western Desert:** With the exception of the oases and a string of villages along the Mediterranean where reliable sources of water are available, the rest of this vast region is uninhabitable. Most of the flora and the fauna in this region survive in these pockets where water is available.